Claims

1. A micromechanical dynamometer, comprising:
   a) a substrate;
   b) a high-compliance deflection element comprising at least one anchor site and at least one input site;
   c) one anchor for each anchor site, extending between the substrate and said anchor site;
   d) a force coupler transferring force from an external source to at least one input site; and,
   e) a displacement gauge functionally attached to the high-compliance deflection element.

2. The dynamometer of claim 1, wherein the high-compliance deflection element comprises crystalline silicon, polycrystalline silicon, amorphous silicon, silicon oxide, silicon nitride, amorphous diamond, or a sol-gel glass.

3. The dynamometer of claim 1, wherein the high-compliance deflection element comprises an annulus of material, said annulus having the shape of a polygon, and essentially constant thickness normal to said polygon.

4. The dynamometer of claim 3, wherein said high-compliance deflection element has a line of mirror symmetry.

5. The dynamometer of claim 3, wherein said polygon is a regular polygon.

6. The dynamometer of claim 1, wherein the high-compliance deflection element comprises a circular

annulus, said annulus having a rectangular cross-section of essentially constant dimensions throughout.

7. The dynamometer of claim 1, wherein said displacement gauge comprises an indicator mechanically coupled to displacements of the high-compliance deflection element.

8. The dynamometer of claim 7, wherein said displacement gauge comprises multiple indicators mechanically coupled to displacements of the high-compliance deflection element, each such indicator being coupled to a different point on the deflection element.

9. The dynamometer of claim 7, wherein said displacement gauge further comprises an optically readable distance scale positioned so that displacement of the indicator can thereby be quantified optically.

10. The dynamometer of claim 1, further comprising a calibration force input.

11. The dynamometer of claim 10, wherein the calibration force input is integral with the force coupler.

12. The dynamometer of claim 1, further comprising a deflection element restraint system.

13. The dynamometer of claim 12, wherein said restraint system comprises motion guides.

14. The dynamometer of claim 13, wherein said restraint system comprises ring constraints.